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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS AND INTERFERENCES

IN RE THE APPLICATION OF)
) Examiner: Philip Sobutka
Hock Chye Gan)
) Group Art Unit No. 2683
SERIAL NO.: 09/286,087)
)
FILED: April 2, 1999)
)
FOR: HLR Data Migration)

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to" Director of Patents and Trademarks, Washington, D.C. 20231" on November 12, 2002.
Name of person signing Jennifer J. Ramirez
Signature _____

BRIEF ON APPEAL

Honorable Director of
Patents and Trademarks
Washington, D.C. 20231

Dear Sir:

This appeal is taken from the examiner's final office action of August 27, 2002, where the examiner has finally rejected all claims of the application, comprising claims 1 - 5 and 7 - 16. The Notice of Appeal is being filed concurrently herewith.

In accordance with the provisions of 37 C.F.R. §1.192, this brief is being submitted in triplicate, accompanied by the necessary fee of $320 pursuant to 37 C.F.R. § 1.17(c).

(1) Real Party in Interest

This application is assigned to Northern Telecom Limited which, by change of name, is now Nortel Networks Limited. Nortel Networks Limited is the real party in interest.

(2) Related Appeals and Interferences

There are no related appeals and interferences.

(3) Status of Claims

This application was filed with claims 1 through 10.

During prosecution of the application, claims 1 to 5 were amended, claim 6 was deleted, claims 7 to 10 were retained as originally filed, and new claims 11 to 16 were added, of which claims 11 and 13 to 16 were subsequently amended.

Claims 1 to 5 and 7 to 16 remain pending in the application and are set forth in their present form as Appendix A.

The rejection of claims 1 to 5 and 7 to 16 is appealed.

(4) Status of Amendments

No amendments were filed following the final office action of August 27, 2002. However, a telephonic interview was held with the examiner on October 25, 2002, where the examiner steadfastly maintained his rejections of the application.

(5) Summary of Invention

The present invention generally relates to the use of Home Location Register (HLR) nodes to support subscribers in a mobile cellular communications system. The invention relates to methods of migrating subscriber data associated with subscriber identities

between HLR nodes. In this regard, the invention comprises three methods relating to the migration of data.

In a first method, the migration of subscriber data is between two HLR nodes which are arranged in a mated pair configuration. That is, that each of the HLR nodes contains the whole of the subscriber data relating to the plurality of subscriber identities that the two HLR nodes between them support. Each HLR node is arranged to support approximately half (in the preferred embodiment) of the subscriber data and this subscriber data has a state of active in that node. The remaining subscriber data in that node has a state of standby. As such, the node configured in this way is able to complete transactions such as the connection of calls for those subscriber identities whose data in that node has a state of active but is unable to complete such transactions for those subscriber identities whose data has a state of standby in that node. In the case where this node receives a transaction request from a subscriber whose subscriber data has a state of standby, then the node conveys the transaction request to the other node of the mated pair configuration. The other HLR node of the mated pair configuration is configured to support those subscribers whose subscriber data has a state of standby in the first node. For these subscribers, their data has a state of active in the second node. It can therefore be seen that between them the two nodes support all subscribers in a load sharing type arrangement. It should also be noted that for those subscribers whose data has a state of active in the first node, the data for these subscribers is given a state of standby in the second node. Consequently, between them the two nodes contain a complete set of subscriber data in active mode and a complete set of said data in standby mode. By "standby" is meant that data in a node that is currently on standby mode can be made active in order to service subscriber connection requests, for example, if the complementary data for that subscriber held in the other HLR node as active is now placed on standby for some reason or is lost or corrupted.

In the case where it is wished to change the balance of load sharing between the two HLR nodes, i.e. where it is wished to migrate some of the subscriber data associated with one or more of the subscriber identities supported by, say, the first node, it is not actually necessary to transfer or copy from the first node to the second node the subscriber data to be migrated since this data already exists in the second node, albeit having a state of standby. Therefore, to effect the migration of subscriber data for a subscriber identity, it is only necessary that at the first node the state of said subscriber data is changed from active to standby and then at the second node "transfer" of the subscriber data from the first node to the second node is completed by changing the state of that subscriber data in the second node from standby to active. The "transfer" of data is therefore effected, not by an actual transmission of data from one node to the other, but by means of coordinating the change of state of that data in the first node from active to standby followed by changing its state from standby to active in the second node.

It will be appreciated that at all times all subscriber data, save for the subscriber data relating to the subscriber identity being migrated, is still available for the completion of subscriber transactions (connection of calls, for example) by the relevant HLR node. The advantage of this method over prior art methods is that only the subscriber data being migrated is, for a short time, not accessible for completion of subscriber transactions while the migration occurs. This contrasts with prior art methods where the migration of subscriber data requires one or other of the nodes to be placed in standby mode, thus disabling all subscriber data on the node for the period that subscriber data migration takes place. In addition to "load sharing" the support of subscribers, the mated pair arrangement of the preferred embodiment of the invention provides also the ability to address the problem encountered when an HLR node fails. In such a case, when one of the HLR nodes fails,

approximately half of subscribers will see no impact on service since they are currently being supported by the other (not failed) node. For those subscribers supported by the failed node, there will be a disruption in service while the functioning HLR node changes the state of its standby subscriber data from standby to active, i.e. while said functioning node takes on responsibility for supporting the active subscribers of the failed node.

The other two methods of the invention relate to the migration of subscriber data from one HLR node to the other when a failed node is fixed to function properly again. In such a situation, the currently functioning (not failed) node is supporting all subscribers, i.e. all subscriber data has a state of active on that node. The newly functioning node no longer has current subscriber data that allows it to support its share of subscribers. In a first method of re-establishing load sharing of the mated pair HLR node configuration, it is firstly necessary to copy from the first (functioning) HLR node all subscriber data associated with the plurality of subscriber identities of the communication network to the second (now fixed) HLR node. At this point in time, all subscriber data in the first node has a state of active. The subscriber data copied to the second node will initially be provided with a state of standby. Consequently, even once the step of copying all data from the first node to the second node is completed, the first node will continue to service all subscribers. In order to re-establish the load sharing arrangement, for each subscriber identity that is to be supported by the second node, i.e. for each subscriber identity whose data is to be migrated from the first node to the second node, the method is as before. That is that in the first node the subscriber data associated with the subscriber identity being migrated has its state changed from active to standby and then in the second node has its state changed from standby to active. By repeating this process for each subscriber data associated with each subscriber identity or each small group of subscriber identities to be supported by the second node, it is possible to re-establish the load sharing arrangement between the two

nodes while at the same time only ever preventing for a short time, while data migration is occurring, the service to the subscriber(s) whose data is in the process being migrated. In other words, as in the first method of the invention, it is not necessary to place the first node on standby (and thus the whole of the subscriber data) while subscriber data is being migrated from it to the second node in order to re-establish the load sharing arrangement.

In the third method of the invention, which is a second method of recovering from a node failure, rather than as a first step of copying all subscriber data relating to the plurality of subscriber identities from the first node to the second node, the method comprises, for each subscriber data associated with a subscriber identity or each small group of subscriber identities to be supported by the second node, at the first node changing the state of that subscriber's data from active to standby, then copying from the first node to the second node that subscriber data and at the second node, once the copying of the data is complete, changing the state of the subscriber data now in the second node from standby to active. This is done for each subscriber data associated with a subscriber identity or each small group of subscriber identities that is to be migrated to the second node to be supported by it. Once again, it is only that subscriber data that is in the process of being migrated that is denied service for the short period of data migration. Other subscribers continue to be supported by the mated pair HLR node configuration. It is not necessary to place either of the HLR nodes on standby.

(6) Issues

There are five issues presented, namely:-

1) rejection of claims 1, 2, 3, 5, 13 and 14 under 35 USC 102(b) as anticipated by Houde et al. (US 5,623,532);

2) rejection of claims 1 to 3, 5, 7 to 10, 13 and 14 under 35 USC 102(e) as anticipated by Ericsson et al (US 5,956,637);

3) rejection of claims 11, 12, 15 and 16 under 35 USC 103(a) in view of Houde et al;

4) rejection of claims 11, 12, 15 and 16 under 35 USC 103(a) in view of Ericsson et al; and

5) rejection of claim 4 under 35 USC 103(a) in view of Ericsson et al and Nguyen (US 6,021,327).

(7) Grouping of Claims

Claims 1 to 5 and 7 to 16 can be considered as a group.

(8) Argument

In the prosecution of the application, a paper entitled "Response" was filed July 11, 2001 in response to an initial Office Action of April 11, 2001. The response was entered by the Examiner. The amendment of that response was to substantively amend claim 1 and add new claims 11 and 12.

A paper entitled "Amendment Accompanying CPA" was filed December 10, 2001. The applicant chose to request a CPA in response to a final Office Action of 9 October 2001 since the applicants anticipated that the response to the final Office Action would be considered by the Examiner to raise new issues. The "Amendment Accompanying CPA" offered amendment of claims 1 to 5, cancellation of claim 6, amendment of claims 11 and 12 and the addition of new claims 13 to 16.

A paper entitled "Response to Office Action of March 12, 2002" was filed May 31, 2002 in response to an Office Action of March 12, 2002. The response was entered by the Examiner. The amendment of that response was to amend claims 1, 11 and 13 to 16.

The Examiner issued a final Office Action on August 27, 2002. In this final Office Action, the Examiner has regurgitated, almost to the word, his grounds for rejecting the claims as contained in the Office Action of March 12, 2002 without appearing to have given any consideration to the applicants' amendment of the claims and supporting arguments, which the applicants will contend in this Appeal Brief remain entirely pertinent to the outstanding issues. It is in light of the Examiner's lack of proper consideration of applicants' response to the Office Action of March 12, 2002 and the dogmatic stance adopted throughout the whole of the prosecution of this application that has caused the applicants to appeal his grounds of rejection as set out in the final Office Action of August 27, 2002.

Taking the five issues in turn:

1. The Examiner has rejected claims 1, 2, 3, 5, 13 and 14 as being anticipated by Houde et al (US 5,623,532).

   The Examiner contends that Houde teaches a method for migrating subscriber data associated with subscriber identities from a first HLR node to a second HLR node comprising the step of sequentially for each subscriber to be migrated transferring active subscriber data associated with the identity from the first node to the second node. He also contends that Houde teaches a diversion further wherein transactions addressed for a subscriber identity arriving at one node are forwarded to the other node. Therefore, the first, diverted, node data record is said by the Examiner to be on standby. It is the applicant's view that the Examiner has misunderstood or misrepresented the true

teaching of the disclosure of Houde and that his conclusion as to the meaning of the term "standby" in the claims of applicant's application is perverse when a proper consideration of the teaching of Houde compared to applicant's application is undertaken.

Referring to Houde, it is clear that there is no teaching of migrating data as proposed by any of the three methods of the present application. It can be seen from Houde, column 6, line 66 to column 7, line 14, and column 10, line 50 to column 11, line 7, that the master HLR platform 32 must be disconnected from the transfer points 38 and 40 in the event of recovering from failure of said master HLR platform in order to enable stored back-up data to be loaded on said platform and for active data to be migrated from the slave platform to said master HLR platform. As such, and as recognized by the Examiner in section 1 of the final Office Action of October 9, 2001, the master HLR platform ("first diverted node") as a whole must be placed in a standby mode, i.e. non-operational mode. This is quite distinct from the present invention in which it is only a small amount of subscriber data that is effectively non-operational for the duration of its data migration, rather than the whole node/platform.

Consequently, the Examiner's contention that Houde et al anticipates any of claims 1, 2, 3, 5, 13 and 14 is clearly wrong and cannot be sustained.

2. The Examiner has rejected claims 1 to 3, 5, 7 to 10, 13 and 14 as being anticipated by Ericsson et al (US 5,956,637)

With respect to Ericsson, similar observations as found above in section 1 with respect to Houde can be made here but, in particular, it should be noted that Ericsson addresses

the problem of which HLR node to store the data of a subscriber in a complex UMTS system based on the location of the subscriber as determined by the system and the subscriber's movement history and behavior in the system. In this case, while subscriber data for a subscriber identity can be said to be transferred from one HLR node to another, it is quite clear that this does not relate to any load sharing or failure mechanism where the nodes cooperate by holding a complementary copy of active subscriber data of one node in standby mode in the other node. Once again, the Examiner also acknowledges in section 2 of the final Office Action of October 9, 2001 that Ericsson teaches that, where subscriber data is migrated from one HLR node to another, that the first HLR node would be in standby mode.

In fact, the Examiner appears to have misunderstood the teaching of Ericsson or what it purports to disclose. For example, in Section 2 of the final Office Action of October 9, 2001, the Examiner states "*Note that Ericsson teaches diverting transactions from one HLR to the other HLR where the subscriber is active (Ericsson, see especially column 4, lines 28-47). Therefore, the first HLR would be in standby, while the second is active.*". It is submitted by the applicant that this section of Ericsson et al teaches no such thing. What this section of Ericsson et al, and particularly lines 39/40, disclose is that, dependent on the subscriber's behavior, the subscriber's HLR data will be transferred from the current HLR to the HLR of the subscriber's most visited area. All this does is merely confirm the purpose of the invention as disclosed in Ericsson et al that, where a subscriber is found to have changed location based on observed behavior, a decision will be taken to transfer his HLR to the HLR of the zone which he appears to be most frequently visiting within the system. There is no mention in this section of Ericsson et al as to the establishment of the diversion of transactions from one HLR to another.

It is submitted that there are other serious flaws in the manner in which the Examiner has arrived at his rejection of the abovementioned claims. In particular, it is clear from the present invention that subscriber data is shared amongst HLRs in such a manner that some active subscriber data in one HLR is mirrored by identical data in another HLR which is placed in a standby mode rather than an active mode. This is an important aspect of the present invention, at least in one of the methods proposed for sharing load between HLRs and for recovering from failure of an HLR. There is nothing in the teaching of Ericsson which addresses this mirroring of active and standby data between the HLRs when, in the case of Ericsson, it is decided that a subscriber's behavior is such that his subscriber data should be transferred to the HLR of his most visited zone. There is no specific teaching in Ericsson that once the subscriber's data is transferred from his initial HLR to that of his most visited zone that the subscriber's data in the original HLR is maintained in a disabled or standby form. Ericsson remains silent on this point and it can only be implied that this is the case. It is equally or logically far more likely that the data would be deleted since there is no purpose for maintaining said data in a standby mode given that Ericsson is not teaching a system in which the active data in one HLR node is mirrored as standby data in another in order to assist recovery from failure of a node, for example.

Consequently, the Examiner's contention that Ericsson et al anticipates any of claims 1 to 3, 5, 7 to 10, 13 and 14 is also wrong and cannot be sustained.

3. The Examiner has rejected claims 11, 12, 15 and 16 as being unpatentable over Houde.

This rejection of the claims is moot in view of the arguments presented in this Appeal Brief under "Arguments", section 1 above.

4. The Examiner has rejected claims 11, 12, 15 and 16 as being unpatentable over Ericsson.

Similarly as to section 3 above, this rejection of these claims is moot in view of the arguments presented in this Appeal Brief under "Arguments", section 2.

5. The Examiner has rejected claim 4 as being unpatentable over Ericsson in view of Nguyen.

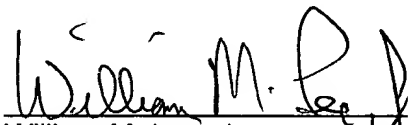
Since claim 4 is dependent on claim 2 which depends from claim 1, this rejection of claim 4 is moot having regard to the foregoing.

Conclusion

In view of the foregoing, it has been demonstrated that the Examiner's rejections cannot be sustained, and reversal is requested.

November 12, 2002

Respectfully submitted,



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APPENDIX A

1. A method of migrating subscriber data associated with a plurality of subscriber identities from a first Home Location Register (HLR) node to a second HLR node, said HLR nodes being arranged such that subscriber data is distributed between said nodes, each node supporting some subscriber data as active data and some subscriber data as standby data, said standby data of each node corresponding to some active subscriber data of the other node, said nodes being connected by a fixed network, wherein, for each subscriber data associated with a subscriber identity or a small group of subscriber identities to be migrated from said first HLR node to said second HLR node, the method comprises the steps of:

A. at said first HLR node, changing a state of said subscriber data from active to standby; and

B. transferring said subscriber data from said first HLR node to said second HLR node by way of changing at said second HLR node the state of the subscriber data from standby to active,

wherein active data of the first HLR node which is not to be migrated or is to be migrated but has not yet been migrated is maintained as active whilst said subscriber data currently being migrated is processed according to steps A and B.

2. A method as claimed in any one of claims 1, 13 or 14, comprising the further step of:

implementing a diversion function such that any of a subscriber data update and a subscriber request transaction addressed for a subscriber identity arriving at one said node where the subscriber data is not active is forwarded to the other node.

3. A method as claimed in claim 2 wherein the diversion function is implemented such that any one of a subscriber data update and a subscriber request transaction addressed for a subscriber identity arriving at said second node is diverted to said first node if said subscriber identity and associated subscriber data is not active in said second node;

and wherein any one of a subscriber data update and a subscriber request transaction addressed for said first node is re-routed by said network to said second node.

4. A method as claimed in claim 2 when dependent on claims 1 and 14 wherein said transfer comprises:

changing the state of said subscriber data in said first HLR from active;

copying said subscriber data from said first to said second HLR;

deleting said subscriber data from said first HLR; and

changing the state of said subscriber data in said second HLR to active.

5. A method as claimed in claim 1 wherein said HLR nodes are arranged into a mated pair such that said active subscriber data is distributed across said nodes and wherein each node comprises a diversion function such that any of a subscriber data update and a subscriber request transaction addressed for a subscriber identity arriving at one said HLR node where the subscriber data is not active is forwarded to the other said HLR node.

7. A method as claimed in claim 5 wherein said transfer comprises the steps of:

disable said subscriber data in said first node;

copy said subscriber data from said first node to said second node;

enable said subscriber data in said second node.

8. A method as claimed in claim 7 wherein said disable step comprises changing the state of said subscriber data in said first node from active to standby.

9. A method as claimed in claim 7 wherein said enable step comprises changing the state of said subscriber data in said second node from standby to active.

10. A method as claimed in claim 5 wherein subscriber data update and request transactions addressed for said first HLR are re-routed by said network to said second HLR.

11. A computer program stored on a machine readable medium which is arranged to implement a method of migrating subscriber data associated with a plurality of subscriber identities from a first Home Location Register (HLR) node to a second HLR node, said HLR nodes being arranged such that subscriber data is distributed between said nodes, each node supporting some subscriber data as active data and some subscriber data as standby data, said standby data of each node corresponding to some active subscriber data of the other node, said nodes being connected by a fixed network, wherein, for each subscriber data associated with a subscriber identity or a small group of subscriber identities to be migrated from said first HLR node to said second HLR node, the method comprises the steps of:

A. at said first HLR node, changing a state of said subscriber data from active to standby; and

B. transferring said subscriber data from said first HLR node to said second HLR node by way of changing at said second HLR node the state of the subscriber data from standby to active,

wherein active data of the first HLR node which is not to be migrated or is to be migrated but has not yet been migrated is maintained as active whilst said subscriber data currently being migrated is processed according to steps A and B.

12. A computer program implemented method as claimed in any one of claims 11, 15 or 16 further comprising the step of:

implementing a diversion function such that any one of a subscriber data update and a subscriber request transaction addressed for a subscriber identity arriving at one said node where the subscriber data is not active is forwarded to the other node.

13. A method of migrating subscriber data associated with a plurality of subscriber identifies from a first Home Location Register (HLR) node to a second HLR node, said HLR nodes being connected by a fixed network, the method comprising the steps of:

copying the subscriber data associated with said plurality of subscriber identities from said first HLR node to said second HLR node;

and, for each subscriber data associated with a subscriber identity or a small group of subscriber identities to be migrated from said first HLR node to said second HLR node, the method comprises the further steps of:

A. at said first HLR node, changing a state of said subscriber data from active to standby; and

B. transferring said subscriber data from said first HLR node to said second HLR node by way of changing at said second HLR node the state of the subscriber data from standby to active,

wherein active data of the first HLR node which is not to be migrated or is to be migrated but has not yet been migrated is maintained as active whilst said subscriber data currently being migrated is processed according to steps A and B.

14. A method of migrating subscriber data associated with a plurality of subscriber identities from a first Home Location Register (HLR) node to a second HLR node, said HLR nodes being connected by a fixed network, for each subscriber data associated with a subscriber identity or a small group of subscriber identities to be migrated from said first HLR node to said second HLR node, the method comprises the steps of:

A. at said first HLR node, changing a state of said subscriber data from active to standby;

B. copying from said first HLR node said subscriber data associated with said subscriber identity or said small group of subscriber identities to said second HLR node; and

C. at said second HLR node, changing the state of said subscriber data from standby to active,

wherein active data of the first HLR node which is not to be migrated or is to be migrated but has not yet been migrated is maintained as active whilst said subscriber data currently being migrated is processed according to steps A to C.

15. A computer program stored on a machine readable medium which is arranged to implement a method of migrating subscriber data associated with a plurality of subscriber identifies from a first Home Location Register (HLR) node to a second HLR node, said HLR nodes being connected by a fixed network, the method comprising the steps of:

copying the subscriber data associated with said plurality of subscriber identities from said first HLR node to said second HLR node;

and, for each subscriber data associated with a subscriber identity or a small group of subscriber identities to be migrated from said first HLR node to said second HLR node, the method comprises the further steps of:

A. at said first HLR node, changing a state of said subscriber data from active to standby; and

B. transferring said subscriber data from said first HLR node to said second HLR node by way of changing at said second HLR node the state of the subscriber data from standby to active,

wherein active data of the first HLR node which is not to be migrated or is to be migrated but has not yet been migrated is maintained as active whilst said subscriber data currently being migrated is processed according to steps A and B.

16. A computer program stored on a machine readable medium which is arranged to implement a method of migrating subscriber data associated with a plurality of subscriber identities from a first Home Location Register (HLR) node to a second HLR node, said HLR nodes being connected by a fixed network, for each subscriber data associated with a subscriber identity or a small group of subscriber identities to be migrated from said first HLR node to said second HLR node, the method comprises the steps of:

A. at said first HLR node, changing a state of said subscriber data from active to standby;

B. copying from said first HLR node said subscriber data associated with said subscriber identity or said small group of subscriber identities to said second HLR node; and

C. at said second HLR node, changing the state of said subscriber data from standby to active,

wherein active data of the first HLR node which is not to be migrated or is to be migrated but has not yet been migrated is maintained as active whilst said subscriber data currently being migrated is processed according to steps A to C.